AN ANALYSIS OF THE RELATIONSHIP BETWEEN METROPOLITAN AND URBAN DOMINANCE AND THE AGE-SEX STRUCTURE OF THE RURAL-FARM POPULATION OF THE NORTH CENTRAL REGION, 1960

Thesis for the Degree of M. A.

MICHIGAN STATE UNIVERSITY
WILLIAM L. RAISER

1967

ABSTRACT

AN ANALYSIS OF THE RELATIONSHIP BETWEEN METROPOLITAN AND URBAN DOMINANCE AND THE AGE-SEX STRUCTURE OF THE RURAL-FARM POPULATION OF THE NORTH CENTRAL REGION, 1960

by William L. Raiser

The objective of this thesis is to study the influence of the ecological variables, metropolitan and urban dominance, upon demographic derivatives of the age-sex structure of the rural-farm population of the North Central region, 1960.

Metropolitan dominance was operationalized in terms of increasing distance from the metropolitan center as measured in 50 mile distance bands. Urban dominance was operationalized in the form of a ten category scale, the first four categories of which are decreasing size of metropolitan population for SMSA counties and the last four categories are decreasing percent of the non-SMSA counties classified as urban. Utilizing these variables the following results were obtained:

1. Decreasing urban dominance, when controlled by distance, produces a gradient pattern within the distance band corresponding to that for the total rural-farm population for each of the age-sex correlates.

2. The proportion of persons under 5 years of age varies in-

versely with urban dominance.

3. The proportion of persons under 15 years of age varies inversely with urban dominance.

4. The proportion of persons 25-44 years of age varies inversely with urban dominance.

5. The proportion of persons 45-64 years of age varies directly with urban dominance.

6. The proportion of persons 65 years of age and over varies directly with urban dominance.

7. The sex ratio varies inversely with urban dominance.

8. The fertility ratio varies inversely with urban dominance.

9. The youth dependency ratio varies inversely with urban dominance.

10. The aged dependency ratio varies directly with urban dominance.

11. The index of aging varies directly with urban dominance.

Contrary to expectation it was found that the proportion of persons 15-24 years of age shows little variation with urban dominance. A partial explanation of this may be the dual nature of the age category itself.

The second urbanity category -SMSA counties with central city of 500,000 to 999,999- consistently showed the most urban pattern. This was explained by its growth pattern in relation to the other SMSA categories.

AN ANALYSIS OF THE RELATIONSHIP BETWEEN METROPOLITAN AND URBAN DOMINANCE AND THE AGE-SEX STRUCTURE OF THE RURAL-FARM POPULATION OF THE NORTH CENTRAL REGION, 1960

By

William L. Raiser

A THESIS

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

MASTER OF ARTS

Department of Sociology

1967

ACKNOWLEDGEMENTS

I wish to express deep appreciation to the members of my guidance committee for their invaluable aid in the compiling of this thesis. These members were Drs. J. Allan Beegle, Chairman, Duane L. Gibson, and Denton Morrison. Without Dr. Beegle's guidance, support, and constructive criticism, Dr. Gibson's willingness to follow through on two separate projects, and Dr. Morrison's willingness to step in at the last moment this thesis could never have been completed.

Special acknowledgements go to Gordon Grant who gave of his time and talents to print this thesis, and to Vera whose constant encouragement and help brightened the way.

Lastly, to my wife whose typing help and moral support contributed greatly to the speedy completion of this thesis.

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER I

INTRODUCTION

The General Problem and Its Significance

The general problem of this thesis is the description of the patterns of settlement in the rural-farm population and an analysis of the variation which appears in those patterns. The problem, therefore, falls within the substantive areas of demography and ecology and is approached at the descriptive and hypothetical levels of analysis.

Specifically, this thesis will focus upon variations in the age-sex structure of the rural-farm[1] population of the North Central region.[2] The age-sex structure of the rural-farm population will be described for varying degrees of urban dominance. Following this a more detailed analysis will be undertaken in which the rural-farm population will be broken down into two sectors; that in SMSA[3] counties and that in non-SMSA counties.

---

1 "In the 1960 census, the farm population consists of persons living in rural territory on places of 10 or more acres from which sales of farm products amounted to $50 or more in 1959 or on places of less than 10 acres from which sales of farm products amounted to $250 or more in 1959." from U.S. Bureau of the Census, Final Report PC (1)-1c, 1962, p. vii.

2 The North Central region includes Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, South Dakota, Nebraska, and Kansas.

In this breakdown an analysis will be made of the individual and joint influence of metropolitan and urban dominance.

The ecological framework of dominance theory will be utilized to predict and explain the variations in the age-sex structure. In such a framework the population of the region is viewed as a more or less integrated system (ecosystem). The ecosystem is organized in relation to certain dominant social sturctures, which, in this case, are either metropolitan or urban communities. The distinction made here derives from the fact that metropolitan pertains to the metropolis which is differentiated from other cities for various factors such as population size and concentration, high level of specialization and division of labor, high level of technological development, etc., whereas urban pertains to all cities.[4] The assumptions of such a viewpoint may, then, be summarized as follows:

1. The human community (including city communities) is an organization one purpose of which is adaptation to the environment.

---

3 "Except in New England, an SMSA is a county or group of contiguous counties which contains at least one city of 50,000 inhabitants or more or 'twin cities' with a combined population of at least 50,000. In addition to the county, or counties, containing such a city or cities, contiguous counties are included in an SMSA if, according to certain criteria, they are essentially metropolitan in character and are socially and economically integrated with the central city." from U.S. Bureau of Census, Final Report PC (1)-1a, 1961, p. xxiv.

4 Donald J. Bogue, The Structure of the Metropolitan Community (University of Michigan, 1949). and Rupert B. Vance and Sara Smith Sutker, "Metropolitan Dominance and Integration," in Rupert B. Vance and N.J. Demerath, eds., The Urban South (North Carolina, 1954), pp. 114-134.

2. New techniques of transportation and production (technological change) have permitted great cities to dominate smaller cities and other communities surrounding them.

3. These outlying communities are subordinate to the metropolis and are integrated with it.

4. This integration of outlying territory (hinterland) with the metropolis has become a standard form of social organization throughout the entire United States.[5]

With regard to the rural population, "...there is considerable body of evidence which indicates that the rural population which lives within ready access of large urban centers differs in its characteristics from the rural population located at more remote distances from such centers. The research findings have generally indicated that both the size of the urban center and the distance away from the center are important factors in producing differentials in rural characteristics."[6] The rural population is, therefore, an integral part of the ecosystem; and it is within such a framework that it becomes the area of concern here.

This thesis focuses upon the rural-farm population for several reasons. 1) The rural-farm sector of the population is a resource sector for the ruban and metropolitan centers in terms of man power and personnel as well as the raw materials of production and consumption. It is, therefore, of vital importance to

---

5 Donald J. Bogue, "The Structure of the Metropolitan Community," in George A. Theodorson, ed., Studies in Human Ecology (New York, 1961), p. 531.

6 O.D. Duncan and A. Reiss, Social Characteristics of Urban and Rural Communities, 1950 (New York, 1956), p. 151.

determine a) the patterns of organization within this sector of the population and b) any trends which appear within the organization of this sector. 2) In an examinantion of the relevance of dominance theory, its adequacy in explaining variances in the patterns of organization of the rural-farm population lend it strength since this sector of the population is generally considered to be the least influenced by dominant metropolitan and urban centers.[7] 3) This sector of the population becomes increasingly interesting when its vital position in the economy of the region is viewed against the fact of its ever decreasing numerical size. The rural-farm population of the United States in absolute terms has decreased steadily -32 million in 1910, 30 million in 1930, 17 million in 1960 and a projected 12 million in 1980.[8] This steady decrease is in drastic contrast to the steady increase of the total population of the United States.

It is in the light of factors such as these that the problem of this thesis gathers descriptive and theoretical significance. The theoretical framework will now be treated specifically and in fuller detail.

---

7 This can be seen quite cleary in Bogue, Structure of the Metropolitan Community, in which the rural-farm sector of the population is termed a subinfluent.

8 Philip M. Hauser, Population Perspectives (New Jersey, 1960), p. 109.

Theoretical Framework

In order to set the stage for the present discussion it is necessary to first review some of the more significant work done in the area of metropolitan and urban dominance.

Any such discussion begins almost automatically with the work of N. S. B. Gras[9] who did the pioneering work in the development of the concept of metropolitan dominance. His primary concern lay in the area of economics, but in analyzing the economic organizational framework of the United States he developed the concept of the metropolitan community. Such a community consists of a metropolis as its center and the surrounding area -the hinterland. The metropolis and hinterland form an integrated system with the metropolis as the managing and organizing center for the whole. Gras saw the development of metropolitan communities as being of central importance in the development of our society since "...the concentration of economic resources in large metropolitan centers has brought about the most effective utilization of resources, human and material, yet known to society."[10]

Next we turn to the work of R. D. McKenzie.[11] McKenzie saw

---

9 N.S.B. Gras, "Rise of the Metropolitan Community," in Ernest Burgess, ed., The Urban Community (Chicago, 1926) and also in Bogue, "The Structure of the Metropolitan Community."

10 Gras, p. 185.

11 R.D. McKenzie, The Metropolitan Community (New York, 1933). and also in Bogue, "The Structure of the Metropolitan Community."

a developmental sequence in types of community structure in the United States. This development proceeded in three stages in conjunction with the varying modes of transportation and communication of the period. The first was the pre-railway era in which settlement was confined to areas accessible to navigable water. Such communities were relatively isolated and independent of one another. Second was the railway era (1850-1900) in which settlement moved westward along the rail routes. The communities which developed at this stage were both child and servant of the rural, agricultural sector of the population. The third era in the development of community organization was the city regionalism era (1900-). At this stage the urban sector of the population became dominant economically, culturally, and socially. The city became the center of organization and influence. The development of motor transportation in this era has allowed for the degree of mobility and flexibility necessary to effectually integrate and organize an entire region about the dominant center.

> The metropolitan region represents a constellation of centers, the interrelations of which are characterized by dominance and subordination. Every region is organized around a central city or focal point of dominance in which are located the institutions and services that cater to the region as a whole and integrate it with other regions. The business subcenters are rarely conplete in their institutional or service structure. They depend upon the main center for the more specialized and integrating functions.[12]

---

12 McKenzie, p. 70.

Based upon this theoretical framework McKenzie makes a detailed study of various metropolitan regions. In this analysis he notes the consistent pattern of decreasing influence or dominance as distance from the metropolitan center increases.

Building upon this theoretical and empirical base Donald J. Bogue has made an intensive study of the structure of the metropolitan community.[13] In his research he divides the entire United States population into 67 metropolitan communities and proceeds to describe their structure. In undertaking his research he attempts to overcome two difficulties of previous research in the area. He contends that "...previous researches in this field have either:

a. Studied only the area immediately surrounding the metropolis and have ignored the outlying territory, or

b. Studied one, or at best only a few, of the broader metropolitan areas -usually those surrounding the very largest cities."[14]

According to various breakdowns of population thus categorized, Bogue provides an extensive descriptive analysis of the metropolitan community. When placing communities on a dominance continuum the rural-farm population is at the bottom of the scale and termed a subinfluent.[15] In his discussion of the rural-farm

---

13 Bogue, The Structure of the Metropolitan Community. and also Bogue, "The Structure of the Metropolitan Community."

14 Bogue, "The Structure of the Metropolitan Community," p. 528.

15 Metropolitan centers -dominants; hinterland cities - subdominants; rural-nonfarm population -influents; and rural-farm population -subinfluents.

population Bogue does not make an analysis of the age-sex structure. His summary treatment of the rural-farm sector of the population is indicative of the lack of quantitative empirical research dealing with this sector of the population.

O. D. Duncan and A. Reiss have also done significant research in this area.[16] While their analysis includes much in relation to the urban sectors of the population, their discussion of the urban influences on the rural population are of specific interest here. By ordering counties into four county type categories they studied the differential affect of decreasing urban influence.[17] Their findings may be summarized as follows. As urban influence decreases:

1. Percentage of youth increases.
2. Middle age groups decrease in size.
3. Percent 65 years of age and over decreases.
4. Little difference is seen in the sex ratio.
5. The fertility ratio increases.

> These results make it clear that blanket characterizations of the rural population tend to be less accurate to the degree that the rural population falls into the area of dominance of urban centers. Probably no part of the rural population in the United States is completely free from urban

---

16 O.D. Duncan, et. al., Metropolis and Region (Baltimore, 1960). and also Duncan and Reiss.

17 The county types were as follows:
Metropolitan, by size of largest place in SMA
1. 250,000 or more
2. Under 250,000
Non-Metropolitan, by size of largest place in county
1. 25,000 or more
2. Under 25,000
as found in Duncan and Reiss, pp. 151-152.

> influence. But the degree of such influence varies greatly, at least partly as a function of proximity to urban centers and the size of those centers.[18]

Various other studies support the theory that the rural-farm sector of the population is indeed organized in a gradient pattern with regard to the distance from the nearest metropolitan center and the size of that center.[19] One study which states explicitly a factor which has been implicit in many of these works will be examined next.

Theodore Anderson and Jane Collier conducted a study in Missouri to determine the influence of metropolitan dominance upon farm size, number of tractors, and level of living of rural people.[20] In general their findings supported the hypotheses that decreasing dominance would be associated with decreasing farm size, level of living, and number of tractors. However, the interesting finding in terms of the present thesis was that

---

18 Duncan and Reiss, p. 168.

19 See James D. Tarver, "Ecological Patterns of Land Tenure, Farm Land Uses, and Farm Population Characteristics," in Rural Sociology, 28 (June, 1963), pp. 128-145; Harold F. Goldsmith and James H. Copp, "Metropolitan Dominance and Agriculture," in Rural Sociology, 29 (December, 1964), pp. 385-395; E.T. Hiller, "Extension of Urban Characteristics into Rural Areas," in Rural Sociology, 6 (Septermber, 1941), pp. 242-257; J. Allan Beegle, "Social Structure and Changing Fertility of the Farm Population," in Rural Sociology, 31 (December, 1966), pp. 415-427; and John E. Stoeckel and J. Allan Beegle, "The Relationship Between the Rural-Farm Age Structure and Distance From a Metropolitan Area," in Rural Sociology, 31 (September, 1966), pp. 346-354.

20 Theodore R. Anderson and Jane Collier, "Metropolitan Dominance and the Rural Hinterland," in Rural Sociology, 21 (June, 1956), pp. 152-170.

urban dominance as opposed to metropolitan dominance may be a better indicator of rural patterns.

The discussion of this thesis is couched in the framework of dominance theory. To summarise, then, the populations and population characteristics of metropolitan communities are expected to exhibit gradient patterns with increasing distance from the metropolis and decreasing size of the metropolis. Similarly, urban centers produce gradient patterns in the rural-farm sector of the population as their influence is decreasingly felt.

From this more general discussion attention is now turned to specific theoretical hypotheses which are developed within this framework.

Theoretical Hypotheses

It is necessary to state explicitly once again that the concern of this thesis is the rural-farm population of the North Central region in 1960. Specifically, it is concerned with the age-sex structure of this sector of the population.

In light of explicit and implicit statements of the various authors, both metropolitan and urban centers are expected to produce similar gradients in the age-sex structure of the rural-farm population. Hence, the following theoretical hypothesis is posited:

> Hypothesis I. Metropolitan and urban dominance will produce similar gradients in the age-sex structure of the rural-farm population.

Based upon the assumption that this hypothesis is accurate, the

following hypotheses will make references only to dominance and thereby indicate both metropolitan and urban dominance.

The question now becomes one of determining the nature of the gradient pattern of dominance in the age-sex structure of the rural-farm population. In an effort to answer this question two modes of dominance must be investigated along with their effect upon the appropriate sectors of the age-sex structure. The first mode of dominance assumes that the rural-farm population becomes decreasingly like the dominant center as dominance decreases. In other words, that portion of the rural-farm population immediately under the influence of the dominant center is expected to manifest characteristics similar to the center while that portion less influenced is expected to display more dissimilar characteristics. The second mode of dominance is based upon the assumption that the rural-farm population is a resource sector for the urban portion of the population and that these population resources are differentially utilized with decreasing dominance.

The first mode of dominance is expected to be the prime source of explanation for gradient variations in the fertility ratio and because of this for the percentage of youth in the rural-farm population. Since this sector of the population is little affected by out-migration of its members any differences which exist under varying degrees of dominance can be primarily attributed to differential fertility. As was noted above in the discussion of the findings of Duncan and Reiss and as has been

noted by others,[21] dominance is inversely related to fertility. Hence, the following theoretical hypotheses are posited:

Hypothesis II. Dominance is inversely related to the fertility ratio of the rural-farm population.

Hypothesis III. Dominance is inversely related to the percentage of youth in the rural-farm population.

The second mode of dominance is expected to be the prime source of explanation for gradient variations in the sex ratio, percent of the rural-farm population 15-44 years of age, percent of the rural-farm population 45-64 years of age, and percent of the rural-farm population 65 years of age and over. That portion of the rural-farm population in the active age groups is a prime target for rural-urban migration. Loomis and Beegle list two significant characteristics of this type of migration. 1) The younger age group (15-24) is the most mobile cohort. And 2) more females than males migrate.[22] The opposite effect occurs in the older age groups. This sector of the population becomes the residue -those who, because of their age, are not desirous and/or not able to migrate.[23] Hence, the following theoretical hypotheses are posited:

Hypothesis IV. Dominance is inversely related to the sex ratio of the rural-farm population.

---

21 Beegle, op. cit., and Ralph Thomlinson, Population Dynamics (New York, 1950), p. 212.

22 Charles P. Loomis and J. Allan Beegle, Rural Social Systems (New York, 1950), p. 212.

23 Stoeckel and Beegle, and Duncan and Reiss.

Hypothesis V. Dominance is inversely related to the percent of the rural-farm population 15-24 years of age.

Hypothesis VI. Dominance is directly related to the percent of the rural-farm population 45-64 years of age.

Hypothesis VII. Dominance is directly related to the percent of the rural-farm population 65 years of age and over.

Thesis Organization

The remainder of the thesis consists of Chapters II thru IV. Chapter II will deal with methodology. Operational definitions of the independent and dependent variables will be stated and the theoretical hypotheses will be reformulated into operational hypotheses. This chapter will also discuss the statistical technique which is utilized.

Of the remaining two chapters, Chapter III will report the results of testing the hypotheses and provide a descriptive analysis of the rural-farm population under varying degrees of dominance. Chapter IV will deal with the implications and conclusions of this analysis.

CHAPTER II

METHODOLOGY

This chapter presents the operational definitions of the independent and dependent variables, the operational hypotheses, and the statistical technique to be utilized.

Operational Definitions

Two independent and five dependent variables need to be specified and formulated in operational terms. These are the independent variables metropolitan and urban dominance and the dependent variables sex ratio, fertility ratio, youth dependency ratio, aged dependency ratio and aging index.

The first variable which will be operationally defined is the independent variable metropolitan dominance. This variable is treated in the traditional manner. Varying distances from the dominant center are determined and the counties of the region are appropriately classified according to this distance variable. The distance segment utilized in this analysis is fifty miles. In this manner each county in the region is classified according to the degree to which it is dominated by the metropolitan center. This manner of classification lends geographic scope to the analysis and overcomes Bogue's criticism of the lack of geographic scope of previous research in the area. Specifically, the indi-

cator of metropolitan dominance -distance- was operationalized in the following manner:

1. Locate the central city of each SMSA on a map which includes the state and county boundaries as well as the location of SMSA's.

2. Using the central city of each SMSA as the center, draw concentric circles around each SMSA. The first or inner-most circle will have a radius of 50 miles, the second circle will have a radius of 100 miles, the third circle will have a radius of 150 miles, etc. This creates bands around each SMSA, each band being 50 miles wide.

3. Assign the value of "1" to the first band, i.e., the band formed by the area of the inner most circle.

4. Assign the value "2" to the second band, i.e., the band formed by the area between the first and the second circle.

5. Continue assigning values to bands. Each band is assigned one more than the value of the preceding band.

6. The major portion of each county will be covered by one or more bands. (A county will be covered by more than one band only when the bands from two or more SMSA's overlap.) Determine for each county the band or bands which cover it.

   (a) If only one band covers the county, assign the value of that band to the county.

   (b) If more than one band covers the county, assign the value of the lowest valued band to the county.

This operationalization of the independent variables, metropolitan and urban dominance, has been adapted from the previous research of Stoeckel and Beegle. In developing the distance indicator of metropolitan dominance the use of the fifty mile band was essentially arbitrary. This figure was chosen, however, because it was assumed that such a distance represented the approximate maximum distance one would regularly commute to work. In addition this roughly represents the broadcast area of local TV stations and circulation areas of newspapers. Therefore, fifty miles has become the unit of distance employed.[1]

The second independent variable, urban dominance, was operationally defined by ranking all SMSA counties according to population size and all non-SMSA counties according to the percent of their population categorized as urban. Due to the very high percentage of the population of SMSA counties classified as urban it was felt that classification according to size was the more meaningfull distinction. In like manner it was felt that ranking non-SMSA counties according to population size would obscure variations in the relative proportion of each county which was urban

---

1 John Stoeckel, "The Impact of Metropolitan Dominance Upon the Status Structure and Status Consistency of Rural-Farm and Urban Populations," Unpublished Ph. D. thesis, Michigan State University, 1966, pp. 20-21; John Edwin Stoeckel, "An Analysis of the Relationship Between the Age Structure and Sex Composition of the Rural-Farm Population and Distance from Standard Metropolitan Statistical Areas," Unpublished M.A. thesis, Department of Sociology and Anthropology, Michigan State University, 1964, pp. 20-22; and John E. Stoeckel and J. Allan Beegle, "The Relationship Between the Rural-Farm Age Structure and Distance from a Metropolitan Area," in Rural Sociology, 31 (September, 1966), pp. 346-354.

or rural in character. Ranking the counties in this manner provides a measure of the nature of the local urban population thereby providing a measure of urbanity. This measure of urbanity, then, becomes the measure of urban dominance utilized. It was specifically operationalized in the following manner:[2]

SMSA Counties

1. 1 million and over
2. 500,000 to 999,999
3. 250,000 to 499,999
4. SMSA under 250,000

Non-SMSA Counties

5. 70.0% or more urban
6. 55.0-69.9% "
7. 40.0-54.9% "
8. 25.0-39.9% "
9. some-24.9% "
10. no urban population

The operational definitions of the dependent variables which are corollaries of the age structure and sex composition of the population correspond to normal practice.[3] They are specifically defined as follows:

$$\text{sex ratio: } \frac{\text{number of males}}{\text{number of females}} \times 1{,}000$$

$$\text{fertility ratio: } \frac{\text{number of persons under 5}}{\text{number of females 15-44}} \times 1{,}000$$

---

2 Stoeckel, "The Impact of Metropolitan Dominance Upon the Status Structure and Status Consistency of Rural-Farm and Urban Populations," pp. 21-22.

3 William Petersen, Population (New York, 1961), pp. 72, 76-83, and 210.

youth dependency ratio:

$$\frac{\text{number of persons under 15}}{\text{number of persons 15-64}} \times 100$$

aged dependency ratio:

$$\frac{\text{number of persons 65 and over}}{\text{number of persons 15-64}} \times 100$$

aging index:

$$\frac{\text{percent of population 65 and over}}{\text{percent of population under 15}} \times 100$$

Operational Hypotheses

Given the operational definitions of the independent and dependent variables and the theoretical hypotheses of the previous chapter, it is now necessary to formulate the operational hypotheses. The hypotheses are here stated in operational form for the rural-farm population of the North Central region of the United States.

1. Decreasing urbanity, when controlled by distance, will produce a gradient pattern within the distance band corresponding to that for the total rural-farm population of the North Central region.

2. The percent of persons under 5 years of age in the rural-farm population of the North Central region will vary inversely with urbanity.

3. The percent of persons under 15 years of age in the rural-farm population of the North Central region will vary inversely with urbanity.

4. The percent of persons 15-24 years of age in the rural-farm population of the North Central region will vary inversely with urbanity.

5. The percent of persons 25-44 years of age in the rural-farm population of the North Central region will vary inversely with urbanity.

6. The percent of persons 45-64 years of age in the rural-farm population of the North Central region will vary directly with urbanity.

7. The percent of persons 65 years of age and over in the rural-farm population of the North Central region will vary directly with urbanity.

8. The sex ratio for the rural-farm population of the North Central region will vary inversely with urbanity.

9. The fertility ratio for the rural-farm population of the North Central region will vary inversely with urbanity.

10. The youth dependency ratio for the rural-farm population of the North Central region will vary inversely with urbanity.

11. The aged dependency ratio for the rural-farm population of the North Central region will vary directly with urbanity.

12. The index of aging for the rural-farm population of the North Central region will vary directly with urbanity.

Statistical Techniques

Kendall's Tau with ties was used in analyzing the relationship between urbanity and the age-sex structure of the rural-farm population of the North Central region. The data is ordinal in nature and the utilization of this statistical measure indicates the degree to which the hypothesized relation increases the ability to predict the ordering of the raw data.[4] In this manner a rough measure of the strength of the hypothesized relationship is arrived at. Further analysis of the data involves the use of contingency tables.

---

4 For a complete discussion of Kendall's Tau with ties see William L. Hays, Statistics for Psychologists (New York, 1963), pp. 652-655.

CHAPTER III

HYPOTHESIS-TESTING AND RESULTS

This chapter gives a descriptive account of the age-sex structure of the rural-farm population of the North Central region by urbanity and reports the results of testing the operational hypotheses. The following format will be utilized: 1) a statement of the hypothesis, 2) a descriptive analysis of that segment of the age-sex structure of the rural-farm population of the North Central region by urbanity, 3) an analysis of the urbanity pattern of SMSA counties, and 4) an analysis of the urbanity pattern of non-SMSA counties by distance over 50 miles.[1]

Before entering on the more detailed discussion of specific characteristics of the rural-farm population of the North Central region it is perhaps helpful to note quickly some of the more general characteristics of the region which bear upon the present analysis. Just naming the states included in the region -Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, South Dakota, Nebraska, and kansas- is sufficient to suggest their diversity. They stretch from the highly urbanized and industrial-

---

1 See John Edwin Stoeckel, "An Analysis of the Relationship Between the Age Structure and Sex Composition of the Rural-Farm Population and Distance from Standard Metropolitan Statistical Areas." Unpublished M.A. thesis, Department of Sociology and Anthropology, Michigan State University, 1964, for descriptive analysis and hypothesis-testing by distance.

ized East to the Great Plains of the West. Change, especially urbanization and industrialization, has proceeded unequally throughout the region. That is, the forces of urbanization and industrialization have been felt at different times and at varying rates. No controls for this type of variation have been introduced into the present analysis and this is a distinct disadvantage. In evaluating the results of this analysis one should also consider that the age-sex structure is being viewed at a given point in time -1960- and a given point in the developmental process of the various sectors of the region. Keeping these factors in mind, we now turn to an analysis of the data.

Hypothesis 1: Decreasing urbanity, when controlled by distance, will produce a gradient pattern within the distance band corresponding to that for the total rural-farm population of the North Central region.

Due to the nature of this hypothesis a test of its validity will be implicit in the analysis of each of the following hypotheses. A more general statement of the validity of this hypothesis will, then, be included in the summary at the end of this chapter.

Hypothesis 2: The percent of persons under 5 years of age in the rural-farm population of the North Central region will vary inversely with urbanity.

The expected relation between the percent of persons under 5 years of age in the rural-farm population of the North Central region and urbanity is supported. Table 1 indicates that the percent of persons under 5 years of age increases with decreasing urbanity. The statistical analysis based upon Kendall's Tau also supports the hypothesis. The hypothesized inverse association is

.70 more probable than any other rank order.

Combining both distance and urbanity (metropolitan and urban dominance) indicators, the SMSA counties will be viewed in more detail. The SMSA counties are treated as a group since they represent all those counties in the first distance band with the exception of two non-SMSA counties which also fit in this category. It was felt that indluding these two counties in the analysis would be unnecessarily tedious while their deletion does not materially alter the results. Therefore, the SMSA counties comprise the first distance band. The hypothesized relation obtains generally in this category. The rather extreme exception in the second urbanity category will be discussed in more generality in the next chapter, following the reporting of the findings for the remainder of the hypotheses.

Attention is now turned to the non-SMSA counties which will be analyzed in terms of both distance and urbanity patterns. As indicated by the data of Table 2, the hypothesized relation is supported in that there is a consistently higher percent of persons under 5 years of age in the lowest urbanity category as compared to the highest. With the exception of the 200 and over distance band, however, the relation is not linear. The varying urbanity pattern by distance is not consistent with the expectations of Hypothesis 1. It will be noted that the use of only the urbanity indicator or the distance indicator of dominance presents a rather oversimplified picture. Hence, both metropolitan and ur-

Table 1. Percent of the Rural-Farm Population of the North Central Region Under 5 Years of Age by Urbanity, 1960.*

Urbanity	Percent under 5
SMSA Counties	
1 million and over	9.2
500,000 to 999,999	7.6
250,000 to 499,999	9.6
SMSA under 250,000	9.9
Non-SMSA Counties	
70% or more urban	9.6
55.0-69.9% urban	10.2
40.0-54.9% urban	9.5
25.0-39.9% urban	10.3
some-24.9% urban	10.5
no urban population	10.5

Kendall's Tau = .70

Table 2. Percent of the Rural-Farm Population of the North Central Region Under 5 Years of Age by Urbanity by Distance Over 50 Miles, 1960.*

Distance	Urbanity			Distance
	55.0%+	25.0-54.9%	24.9%-	Total
50-100	9.9	9.4	10.3	9.7
100-150	9.9	9.9	10.0	9.9
150-200	10.2	10.9	10.7	10.7
200 & over	11.4	11.9	12.6	12.3

* Based on U.S. Census of Population: 1960. Final Report PC (1)-c, 1963.

ban dominance exercise important influences.

Hypothesis 3: The percent of persons under 15 years of age in the rural-farm population of the North Central region will vary inversely with urbanity.

The expected relation between the percent of persons under 15 years of age in the rural-farm population of the North Central region and urbanity is supported. As can be seen from Table 3, the percent of persons under 15 years of age increases with decreasing urbanity. The statistical analysis supports the hypothesis since the hypothesized inverse association is .67 more probable than any other rank order.

Turning attention to the SMSA counties, Table 3 indicates that the expected relation is generally supported. Again, the noted exception is the second urbanity category.

Analyzing the non-SMSA counties by urbanity and distance, the general relation is once again supported by the data of Table 4. As before, the urbanity pattern is not totally confirmed with the exception of the 200 and over distance band. Hypothesis 1 is, therefore, only partially supported.

Hypothesis 4: The percent of persons 15-24 years of age in the rural-farm population of the North Central region will vary inversely with urbanity.

The expected relation between the percent of persons 15-24 years of age in the rural-farm population of the North Central region and urbanity is not supported. As can be seen from Table 5, the percent of persons 15-24 years of age decreases slightly with increasing urbanity. The statistical analysis also supports the

Table 3. Percent of the Rural-Farm Population of the North Central Region Under 15 Years of Age by Urbanity, 1960.*

Urbanity	Percent Under 15
SMSA Counties	
1 million and over	30.4
500,000 to 999,999	27.5
250,000 to 499,999	31.9
SMSA under 250,000	31.9
Non-SMSA Counties	
70% or more urban	31.1
55.0-69.9% urban	32.7
40.0-54.9% urban	31.3
25.0-39.9% urban	32.8
some-24.9% urban	33.2
no urban population	33.0

Kendall's Tau = .67

Table 4. Percent of the Rural-Farm Population of the North Central Region Under 15 Years of Age by Urbanity by Distance Over 50 Miles, 1960.*

Distance	Urbanity			Distance
	55.0%+	25.0-54.9%	24.9%-	Total
50-100	32.2	31.0	32.4	31.6
100-150	31.9	31.9	32.0	31.9
150-200	32.5	34.4	33.7	33.8
200 & over	35.1	36.3	37.1	36.7

* Based on U. S. Census of Population: 1960. Final Report PC (1)-c, 1963.

observation that there is a slight relation in the direction opposite to that predicted. Caution needs to be exercised in interpreting a value of Kendall's Tau as low as this, however. It may indicate either the virtual lack of association or that the form of the relation tends to be nonmonotonic.[2] In this case there is a virtual lack of relation, and one partial explanation of this lack of association may be that the age group is in actuality composed of two separate subgroups. The younger segment -perhaps those from 15 to 17 or 18- is probably relatively nonmobile thereby offseting, by its lack of mobility, the out-migration of the older segment of the age group.[3]

The SMSA counties exhibit a parabolic urbanity pattern, as seen in Table 5, instead of the inverse linear relation predicted. If the second urbanity category is disregarded as being atypical the hypothesized relation is still only slightly confirmed.

Analyzing the non-SMSA counties by urbanity and distance, Table 6 indicates that the hypothesized relation is only slightly supported in the 150-200 and 200 & over distance bands. An inverse relation obtains in the 50-100 distance band and there is no difference by urbanity in the 100-150 distance band. The picture, therefore, is far from clear for this age group. In general,

---

2 William L. Hays, Statistics for Psychologists (New York, 1963), p. 655.

3 John E. Stoeckel and J. Allan Beegle, "The Relationship Between the Rural-Farm Age Structure and Distance From a Metropolitan Area," Rural Sociology, 31 (September, 1966), pp. 346-354.

Table 5. Percent of the Rural-Farm Population of the North Central Region 15-24 Years of Age by Urbanity, 1960.*

Urbanity	Percent 15-24
SMSA Counties	
1 million and over	12.2
500,000 to 999,999	13.3
250,000 to 499,999	13.0
SMSA under 250,000	12.9
Non-SMSA Counties	
70% or more urban	12.3
55.0-69.9% urban	12.5
40.0-54.9% urban	12.7
25.0-39.9% urban	12.6
some-24.9% urban	12.8
no urban population	12.3

Kendall's Tau = -.18

Table 6. Percent of the Rural-Farm Population of the North Central Region 15-24 Years of Age by Urbanity, by Distance Over 50 Miles, 1960.*

Distance	Urbanity			Distance Total
	55.0%+	25.0-54.9%	24.9%-	
50-100	12.7	12.8	12.5	12.7
100-150	12.5	12.5	12.5	12.5
150-200	12.2	13.0	12.7	12.7
200 & over	12.5	12.9	12.6	12.6

* Based on U. S. Census Population: 1960. Final Report PC (1)-c, 1963.

neither Hypothesis 4 nor Hypothesis 1 is supported.

Hypothesis 5: The percent of persons 25-44 years of age in the rural-farm population of the North Central region will vary inversely with urbanity.

The expected relation between the percent of persons 25-44 years of age in the rural-farm population of the North Central region and urbanity is supported. As can be seen from Table 7, the percent of persons 25-44 years of age increases with decreasing urbanity. The statistical analysis supports the hypothesis since the hypothesized inverse association is .57 more probable than any other rank order.

Considering the SMSA counties according to urbanity, Table 7 indicates that the hypothesized relation is generally supported. Again, the exception is the second urbanity category.

Analyzing the non-SMSA counties by urbanity and distance, Table 8 indicates that the hypothesized relation is not supported except in the 200 & over distance band. With the above exception it seems that distance and urbanity affect the percent of persons 25-44 years of age in the rural-farm population inversely. Such a relation is the inverse of that proposed in Hypothesis 1. At present no explanation of the phenomenon is given. The necessity of further research is indicated.

Hypothesis 6: The percent of persons 45-64 years of age in the rural-farm population of the North Central region will vary directly with urbanity.

The expected relation between the percent of persons 45-64 years of age in the rural-farm population of the North Central

Table 7. Percent of the Rural-Farm Population of the North Central Region 25-44 Years of Age by Urbanity, 1960.*

Urbanity	Percent 25-44
SMSA Counties	
1 million and over	21.3
500,000 to 999,999	20.8
250,000 to 499,999	21.7
SMSA under 250,000	21.9
Non-SMSA Counties	
70% or more urban	22.0
55.0-69.9% urban	22.4
40.0-54.9% urban	21.8
25.0-39.9% urban	22.0
some-24.9% urban	21.9
no urban population	22.2

Kendall's Tau = .57

Table 8. Percent of the Rural-Farm Population of the North Central Region 25-44 Years of Age by Urbanity by Distance Over 50 Miles, 1960.*

Distance	Urbanity			Distance
	55.0%+	25.0-54.9%	24.9%-	Total
50-100	22.7	21.8	22.0	22.0
100-150	22.2	22.0	21.8	21.9
150-200	21.8	21.6	21.7	21.7
200 & over	23.6	23.1	24.0	23.7

* Based on U. S. Census Population: 1960. Final Report PC (1)-c, 1963.

region and urbanity is generally supported. As can be seen from Table 9, the percent of persons 45-64 years of age generally decreases with decreasing urbanity. The statistical analysis supports the hypothesis since the hypothesized direct association is .39 more probable than any other rank order. As can be seen by Table 9 and as is indicated by the relatively low value of Kendall's Tau, the relation is not monotonic. Therefore, only partial and qualified support is given to the hypothesis. As in the 15-24 year age group, the low level of support for this hypothesis may be due to the lack of homogeneity of the population within the category. The lower ages may continue to exhibit a pattern of out-migration in partial opposition to the stability of the older ages.

Analyzing the SMSA counties, Table 9 indicates that the hypothesized relation is supported. Once again, the second urbanity category is an exception although not in the extreme.

Analyzing the non-SMSA counties by urbanity and distance, Table 10 indicates that the hypothesized relation is supported in the last two distance bands but not in the first two. As in the 25-44 year age group there seems to be a slight inverse relation between metropolitan and urban dominance. Therefore, both Hypothesis 6 and Hypothesis 1 are only partially supported.

Hypothesis 7: The percent of persons 65 years of age and over in the rural-farm population of the North Central region will vary directly with urbanity.

The expected relation between the percent of persons 65

Table 9. Percent of the Rural-Farm Population of the North Central Region 45-64 Years of Age by Urbanity, 1960.*

Urbanity	Percent 45-64
SMSA Counties	
1 million and over	25.2
500,000 to 999,999	26.0
250,000 to 499,999	23.4
SMSA under 250,000	23.3
Non-SMSA Counties	
70% or more urban	25.2
55.0-69.9% urban	23.0
40.0-54.9% urban	23.9
25.0-39.9% urban	23.3
some-24.9% urban	23.1
no urban population	23.8

Kendall's Tau = .67

Table 10. Percent of the Rural-Farm Population of the North Central Region 45-64 Years of Age by Urbanity by Distance Over 50 Miles, 1960.*

Distance	Urbanity			Distance Total
	55.0%+	25.0-54.9%	24.9%-	
50-100	22.8	23.8	23.4	23.5
100-150	23.7	23.9	24.4	24.1
150-200	24.5	22.6	23.7	23.4
200 & over	21.8	21.5	20.6	21.0

* Based on U. S. Census Population: 1960. Final Report PC (1)-c, 1963.

years of age and over in the rural-farm population of the North Central region and urbanity is supported. As can be seen from Table 11, the percent of persons 65 years of age and over decreases with decreasing urbanity. The statistical analysis supports the hypothesis since the hypothesized direct association is .78 more probable than any other rank order.

Analyzing the SMSA counties, Table 11 indicates that the hypothesized relation is generally supported. The notable exception is, again, the second urbanity category.

Analyzing the non-SMSA counties by urbanity and distance, Table 12 indicates that the hypothesized relation is supported with the exception of the first urbanity category. This slight drop may be caused by the increased availability of rest home facilities in the 50-100 mile distance category and highly urbanized counties. Both Hypothesis 7 and Hypothesis 1 are supported.

Hypothesis 8: The sex ratio for the rural-farm population of the North Central region will vary inversely with urbanity.

The expected relation between the sex ratio for the rural-farm population of the North Central region and urbanity is supported. As can be seen from Table 13, the sex ratio increases with decreasing urbanity. The statistical analysis supports the hypothesis since the hypothesized inverse association is .68 more probable than any other rank order.

Analyzing the SMSA counties, the hypothesized relation is given very little support. There is little difference in the

Table 11. Percent of the Rural-Farm Population of the North Central Region 65 Years of Age and Over by Urbanity, 1960.*

Urbanity	Percent 65 and Over
SMSA Counties	
1 million and over	10.8
500,000 to 999,999	12.5
250,000 to 499,999	10.0
SMSA under 250,000	9.9
Non-SMSA Counties	
70% or more urban	9.4
55.0-69.9% urban	9.3
40.0-54.9% urban	10.3
25.0-39.9% urban	9.2
some-24.9% urban	9.0
no urban population	8.6

Kendall's Tau = .78

Table 12. Percent of the Rural-Farm Population of the North Central Region 65 years of Age and Over by Urbanity by Distance Over 50 Miles, 1960.*

Distance	Urbanity			Distance Total
	55.0%+	25.0-54.9%	24.9%	
50-100	9.6	10.7	9.7	10.2
100-150	9.8	9.6	9.4	9.5
150-200	9.0	8.4	8.2	8.4
200 & over	7.0	6.3	5.7	6.0

* Based on U. S. Census Population: 1960. Final Report PC (1)-c, 1963.

sex ratio with the obvious and expected exception of the second urbanity category. This and the pattern for the non-SMSA counties is in accord with the findings of Duncan and Reiss.[4] They found that the sex ratio remained roughly the same until one got into the most rural of categories.

Analyzing the non-SMSA counties by urbanity and distance, the hypothesized relation is supported by the data in Table 14. Hypothesis 1 is only partially supported, however, since the relation in the various distance bands tends to be parabolic instead of the hypothesized linear.

Hypothesis 9: The fertility ratio for the rural-farm population of the North Central region will vary inversely with urbanity.

The expected relation between the fertility ratio of the rural-farm population of the North Central region and urbanity is supported. As can be seen from Table 15, the fertility ratio increases with decreasing urbanity. The statistical analysis supports the hypothesis since, the hypothesized inverse association is .73 more probable than any other rank order.

Analyzing the SMSA counties, Table 15 indicates that the hypothesized relation is supported. The exception is, again, the second urbanity category.

Analyzing the non-SMSA counties by urbanity and distance, Table 16 indicates that the hypothesized relation is supported. Both Hypothesis 9 and Hypothesis 1 are strongly supported.

---

4 O.D. Duncan and A. Reiss, Social Characteristics of Urban and Rural Communities, 1950 (New York, 1956), p. 33.

Table 13. Sex Ratio of the Rural-Farm Population of the North Central Region by Urbanity, 1960.*

Urbanity	Sex Ratio
SMSA Counties	
1 million and over	1085
500,000 to 999,999	1055
250,000 to 499,999	1085
SMSA under 250,000	1086
Non-SMSA Counties	
70% or more urban	1093
55.0-69.9% urban	1093
40.0-54.9% urban	1083
25.0-39.9% urban	1093
some-24.9% urban	1097
no urban population	1121

Kendall's Tau = .68

Table 14. Sex Ratio of the Rural-Farm Population of the North Central Region by Urbanity by Distance Over 50 Miles, 1960.*

Distance	Urbanity			Distance Total
	55.0%+	25.0-54.9%	24.9%-	
50-100	1075	1067	1080	1072
100-150	1088	1092	1114	1100
150-200	1125	1118	1126	1123
200 & over	1113	1135	1133	1131

* Based on U. S. Census Population: 1960. Final Report PC (1)-c, 1963.

Table 15. Fertility Ratio of the Rural-Farm Population of the North Central Region by Urbanity, 1960.*

Urbanity	Fertility Ratio
SMSA Counties	
1 million and over	560
500,000 to 999,999	454
250,000 to 499,999	567
SMSA under 250,000	579
Non-SMSA Counties	
70% or more urban	577
55.0-69.9% urban	598
40.0-54.9% urban	564
25.0-39.9% urban	612
some-24.9% urban	622
no urban population	634

Kendall's Tau = .73

Table 16. Fertility Ratio of the Rural-Farm Population of the North Central Region by Urbanity by Distance Over 50 Miles, 1960.*

Distance	Urbanity			Distance Total
	55.0%+	25.0-54.9%	24.9%-	
50-100	572	555	606	573
100-150	588	592	601	595
150-200	622	655	653	649
200 & over	653	686	724	705

* Based on U. S. Census Population: 1960. Final Report PC (1)-c, 1963.

Hypothesis 10: The youth dependency ratio for the rural-farm population of the North Central region will vary inversely with urbanity.

The expected relation between the youth dependency ratio of the rural-farm population of the North Central region and urbanity is supported. As can be seen from Table 17, the youth dependency ratio increases with decreasing urbanity. The statistical analysis supports the hypothesis since, the hypothesized inverse association is .60 more probable than any other rank order.

Analyzing the SMSA counties, Table 17 indicates that the hypothesized relation is moderately supported. Once again, the second urbanity category is an exception to the slight upward trend in the youth dependency ratio.

Analyzing the non-SMSA counties by urbanity and distance, Table 18 indicates that the hypothesized relation is supported. The last two distance categories conform to the expectations of Hypothesis 1, but the first two exhibit variations. Therefore, this hypothesis is only moderately supported.

Hypothesis 11: The aged dependency ratio for the rural-farm population of the North Central region will vary directly with urbanity.

The expected relation between the aged dependency ratio of the rural-farm population of the North Central region and urbanity is supported. As can be seen from Table 19, the aged dependency ratio decreases with decreasing urbanity. The statistical analysis supports the hypothesis since, the hypothesized direct association is .69 more probable than any other rank order.

Table 17. Youth Dependency Ratio of the Rural-Farm Population of the North Central Region by Urbanity, 1960.*

Urbanity	Youth Dependency Ratio
SMSA Counties	
1 million and over	51.80
500,000 to 999,999	45.72
250,000 to 499,999	54.93
SMSA under 250,000	54.80
Non-SMSA Counties	
70% or more urban	52.19
55.0-69.9% urban	56.30
40.0-54,9% urban	53.47
25.0-39.9% urban	56.54
some-24.9% urban	57.36
no urban population	56.51

Kendall's Tau = .60

Table 18. Youth Dependency Ratio of the Rural-Farm Population of the North Central Region by Urbanity by Distance Over 50 Miles, 1960.*

Distance	Urbanity			Distance Total
	55.0%+	25.0-54.9%	24.9%-	
50-100	55.38	53.15	56.08	54.36
100-150	54.70	54.63	54.44	54.56
150-200	55.51	60.07	58.02	58.38
200 & over	60.67	63.16	64.97	63.95

* Based on U. S. Census Population: 1960. Final Report PC (1)-c, 1963.

Analyzing the SMSA counties, Table 19 indicates that the hypothesized relation is supported. Again, the second urbanity category is an exception.

Analyzing the non-SMSA counties by urbanity and distance, Table 20 indicates that the hypothesized relation is supported with the exception of the 50-100 distance band. Both Hypothesis 11 and Hypothesis 1 are strongly supported by the data.

Hypothesis 12: The index of aging for the rural-farm population of the North Central region will vary directly with urbanity.

The expected relation between the index of aging for the rural-farm population of the North Central region and urbanity is supported. As can be seen in Table 21, the index of aging decreases with decreasing urbanity. The statistical analysis supports the hypothesis since the hypothesized direct association is .78 more probable than any other rank order.

Analyzing the SMSA counties, Table 21 indicates that the hypothesized relation is moderately supported. Again, the second urbanity category is an exception.

Analyzing the non-SMSA counties by urbanity and distance, Table 22 indicates that the hypothesized relation is supported with the exception of the first distance band. Both Hypothesis 12 and Hypothesis 1 are strongly supported by the data.

Summary of Findings

Hypothesis 1, which states that:

Decreasing urbanity, when controlled by distance, will pro-

Table 19. Aged Dependency Ratio of the Rural-Farm Population of the North Central Region by Urbanity, 1960.*

Urbanity	Aged Dependency Ratio
SMSA Counties	
1 million and over	18.45
500,000 to 999,999	20.74
250,000 to 499,999	17.27
SMSA under 250,000	17.08
Non-SMSA Counties	
70% or more urban	15.86
55.0-69.9% urban	16.00
40.0-54.9% urban	17.63
25.0-39.9% urban	15.93
some-24.9% urban	15.56
no urban population	14.68

Kendall's Tau = .69

Table 20. Aged Dependency Ratio of the Rural-Farm Population of the North Central Region by Urbanity by Distance Over 50 Miles, 1960.*

Distance	Urbanity			Distance
	55.0%+	25.0-54.9%	24.9%-	Total
50-100	16.44	18.31	16.83	17.58
100-150	16.73	16.48	15.94	16.29
150-200	15.35	14.77	14.19	14.59
200 & over	12.10	10.87	9.99	10.49

* Based on U. S. Census Population: 1960. Final Report PC (1)-c, 1963.

Table 21. Index of Aging of the Rural-Farm Population of the North Central Region by Urbanity, 1960.*

Urbanity	Index of Aging
SMSA Counties	
1 million and over	35.52
500,000 to 999,999	45.42
250,000 to 499,999	31.34
SMSA under 250,000	31.03
Non-SMSA Counties	
70% or more urban	30.22
55.0-69.9% urban	28.44
40.0-54.9% urban	32.90
25.0-39.9% urban	28.04
some-24.9% urban	27.10
no urban population	26.06

Kendall's Tau = .78

Table 22. Index of Aging of the Rural-Farm Population of the North Central Region by Urbanity by Distance Over 50 Miles, 1960.*

Distance	Urbanity			Distance Total
	55.0%+	25.0-54.9%	24.9%-	
50-100	29.81	34.51	29.93	32.27
100-150	30.72	30.09	29.37	29.78
150-200	27.69	24.41	24.33	24.85
200 & over	19.94	17.35	15.36	16.34

* Based on U. S. Census Population: 1960. Final Report PC (1)-c, 1963.

> duce a gradient pattern within the distance band corresponding to that for the total rural-farm population of the North Central region;

was generally supported by the data. The one notable exception to this is found in the group 25-44 years of age. In this group an inverse relation was found in the non-SMSA counties when controlled by urbanity and distance. It was also found that the hypothesized relation was a better predictor in the higher distance categories. The data, therefore, moderately supported the contenteention that metropolitan and urban dominance produce similar effects in the hinterland population and operated jointly.

The data generally supported the hypothesis that there is an inverse relation between urbanity and the percent of the rural-farm population of the North Central region under 5 years of age, under 15 year s of age, 25-44 years of age and between urbanity and the sex ratio, fertility ratio, and youth dependency ratio. The data also generally supported the hypothesis that there is a direct relation between urbanity and the percent of the rural-farm population of the North Central region 45-64 years of age and 65 years of age and over, and between urbanity and the aged dependency ratio and the index of aging. The data did not support the hypothesis that there is an inverse relation between urbanity and the percent of the rural-farm population of the North Central region 15-24 years of age. There was a general lack of relation between urbanity and the percent of the population in thia age group.

CHAPTER IV

DISCUSSION AND CONCLUSIONS

This chapter discusses the unexpected findings associated with the second urbanity category (SMSA's 500,000 to 999,999). Following this, conclusions and implications of the present analysis will be presented.

Unexpected Findings

In reporting the results of hypothesis-testing it will be remembered that the second urbanity category consistently did not fit the pattern expected. This category designated the SMSA counties with central city of 500,000 to 999,999. If this category is viewed in relation to the entire urbanity pattern, in each grouping of the population it represents the peak of urban organization. In other words, if the first and second urbanity categories were interchanged the patterning of the population would follow more closely the predicted ordering. (The 15-24 year old age group is an exception but it will also be remembered that this same age group did not conform to the hypothesized relation.) The question now becomes that of explaining why this particular category presents the most urban pattern. In an attempt to answer this question, attention is turned to the growth pattern of the various urbanity categories. In examining the rate of change in satellite

areas compared to that in the central city, Hawley found that SMSA's corresponding to the second urbanity category exhibit the highest ratio of change.[1] Further, in examining the percent change of satellite incorporated population in SMSA's by size of SMSA and distance from the SMSA, Hawley found that in the 35 miles and over distance band the SMSA's of category two exhibit a change rate slightly over three times as high as that in any other category. (52.3% versus 18.3% for the next highest category.)[2] The 35 miles and over distance band was utilized for it was felt that this would be the segment of the population and the portion of the land area in closest contact with the rural-farm segment of the population. Since one of the major modes of dominance affecting the rural-farm population is its utilization as a resource sector for the urban areas, a rapidly growing urban population would be expected to draw more heavily on such resources. If this is the case, it may offer at least a partial explanation of the exceptional nature of the data regarding this urbanity category.

Conclusions and Implications

This research points to the utility of a sociological perspective when dealing with the interrelationships among the various parts of society. The importance of structural variables in

---

1 Amos H. Hawley, The Changing Shape of Metropolitan America (Glencoe, Illinois, 1956), p. 44.

2 Ibid., p. 54.

dealing with society is brought to the fore. Too often a microcosmic view of a situation is taken and, thereby, the structural position of the part within the larger whole is overlooked. This has, perhaps, been especially true in dealing with the rural-farm population sector since it is usually approached in the framework of the rural-urban dichotomy. Even when speaking of metropolitan or urban dominance the tendency is to see the overshadowing influence of the dominant urban center upon the rural hinterland. Instead, the interpenetration and interrelation of each of the parts within the whole needs to be viewed. The metropolitan system consists of what might be termed urban and rural parts, but all are inseparably bound together in mutual interdependence within the structure of the whole. Perhaps this point is being belabored, but its importance cannot be minimized. Structure and position in the structure are important variables in the determination of the inner functionings of the part itself.

This research has indicated some of the ways in which the nature of various parts of the rural-farm population is affected by structural position. Proximity to a metropolitan center, the characteristics of that center, and the characteristics of the local urban population have all been seen to be correlated with characteristics of the age-sex structure of the rural-farm population. This research is, perhaps, more relevant in what it indicates for future research in these areas than in any specific conclusions which it has reached.

The differences which appear in the broad groupings of SMSA types indicates that more needs to be done in determining the specific relationship between various metropolitan characteristics and the structure of the metropolitan system. The data which has been utilized in the present study has aggregated across metropolitan types, levels of urbanization, and regional location. The fact that such a high level of ordinal association was found, in most cases, between the independent and dependent variables suggests that there is an underlying similarity in the structure of metropolitan systems; but variations in pattern between various metropolitan types need to be studied and integrated into a more inclusive theoretical framework.[3] Specifically, variations between national, regional, and local metropolitan types needs to be investigated. And, the above research indicates that variations associated with the size and growth rate of the metropolitan center need to be investigated.

This ecological framework implies that the rural-farm sector can not be viewed as merely "rural-farm" but must be viewed in relation to its structural position, as was stated above. Therefore, its role in relation to the workings of the larger whole needs to be determined along with the effects of this role upon its inner relationships.

One role of the rural-farm sector is to act as a population

---

3 Donald J. Bogue, "Population Distribution," in The Study of Population, ed. Philip M. Hauser and Otis D. Duncan (Chicago, 1959), pp. 383-399.

resource -a manpower reserve. The educational system in this sector should reflect this fact and provide the type of education which will allow for a rather high portion of the youth to make the transition from a rural to an urban setting. Education needs to meet the dual role of equipping those who will become out-migrants and at the same time providing equivalent educational stimulus and opportunity for those who will remain.

Service organizations need to be oriented to the fact that a high proportion of aged reside in rural areas and the proportion increases with increasing proximity to the center. Proper facilities need to be maintained without placing undue burden upon the relatively low proportion of the population in the active age years. This indicates the need for easy access to the service facilities of the center for the aged.

In any attempt to implement changes within the rural-farm population or to attempt to understand changes which are occuring structural position and structural factors need to be considered. Are the requirements for the resources -human, fiber, and foodstuffs- changing, diminishing, or increasing thereby, changing the nature of the rural-farm role? With increasing access to mass communication and first hand experience in urban environments, is the nature of urban influence upon the rural-farm sector changing? With the changing structure of society and increasing emphasis upon and concentration in urban centers, what changes have taken place and are taking place in the power structure of the

metropolitan, state, regional, and national systems? All these and many other questions require that the structure of the metropolitan system and the interrelationships of the parts be the focus of further research and investigation.

LITERATURE CITED

Anderson, Theodore R. and Jane Collier. "Metropolitan Dominance and the Rural Hinterland," Rural Sociology, XXI (June, 1956), pp. 152-170.

Beegle, J. Allan. "Social Structure and Changing Fertility of the Farm Population," Rural Sociology, XXXI (December, 1966), pp. 415-427.

Bogue, Donald J. "Population Distribution," in The Study of Population, ed. Philip M. Hauser and Otis D. Duncan. Chicago: The University of Chicago Press, 1959. Pp. 383-399.

_____. "The Structure of the Metropolitan Community," in Studies in Human Ecology, ed. George A. Theodorson. Evanston, Illinois: Row & Peterson, 1961. Pp. 524-537.

_____. The Structure of the Metropolitan Community. Ann Arbor, Michigan: University of Michigan Press, 1949.

Duncan, Otis D. and A. Reiss. Social Characteristics of Urban & Rural Communities. New York: John Wiley, 1956.

Duncan, Otis D., et. al. Metropolis and Region. Baltimore: Johns Hopkins Press, 1960.

Goldsmith, Harold F. and James H. Copp. "Metropolitan Dominance and Agriculture," in Rural Sociology, XXVIII (June, 1963), pp. 385-395.

Gras, N. S. B. "Rise of the Metropolitan Community," in The Urban Community, ed. Ernest W. Burgess. Chicago: The University of Chicago Press, 1926.

Hauser, P. Population Perspectives. New Brunswick, New Jersey: Rutgers University Press, 1960.

Hawley, Amos. The Changing Shape of Metropolitan America. Glencoe, Illinois: The Free Press, 1956.

Hiller, E. T. "Extension of Urban Characteristics into Rural Areas," in Rural Sociology, VI (September, 1941), pp. 242-257.

Loomis, Charles P. and J. Allan Beegle. Rural Social Systems. New York: Prentice-Hall, Inc., 1950.

McKenzie, R. D. The Metropolitan Community. New York: McGraw-Hill, 1933.

Peterson, William. Population. New York: The Macmillan Company, 1961.

Stoeckel, John E. and J. Allan Beegle. "The Relationship Between the Rural-Farm Age Structure and Distance from a Metropolitan Area," in Rural Sociology, XXXI (September, 1966), pp. 346-354.

Stoeckel, John. "An Analysis of the Relationship Between the Age Structure and Sex Composition of the Rural-Farm Population and Distance from Standard Metropolitan Statistical Areas." Unpublished M.A. thesis, Department of Sociology and Anthropology, Michigan State University, 1964.

_____. "The Impact of Metropolitan Dominance Upon the Status Structure and Status Consistency of Rural-Farm and Urban Populations." Unpublished Ph. D. thesis, Department of Sociology, Michigan State University, 1966.

Tarver, James D. "Ecological Patterns of Land Tenure, Farm Land Uses, and Farm Population Characteristics," in Rural Sociology, XXVIII (June, 1963), pp. 128-145.

Thomlinson, Ralph. Population Dynamics. New York: Random House, 1965.

U. S. Bureau of the Census. U. S. Census of Population: 1960, General Social and Economic Characteristics, United States Summary. Final Report PC (1)-c. U. S. Government Printing Office, Washington, D. C., 1962.

U. S. Bureau of the Census. U. S. Census of Population: 1960, Number of Inhabitants, United States Summary. Final Report PC (1)-a. U. S. Government Printing Office, Washington, D. C., 1961.

Vance, Rupert.B. and Sara Smith Sutker. "Metropolitan Dominance and Integration," in The Urban South, ed. Rupert B. Vance and N. J. Demerath. North Carolina: The University of North Carolina Press, 1954. Pp. 114-134.

Warren, Roland L. The Community in America. Chicago: Rand McNally & Company, 1963.